Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Access to Telecommunications Equipment and Services for people with disabilities	)	**CG Docket 13-46**
Amendment of the Commission's Rules Governing Hearing Aid-Compatible Mobile Handsets	)	**WT Docket 07-250**
Comment sought on 2010 review of Hearing Aid Compatibility regulations.	)	**WT Docket 10-254**

REPORT and PETITION
of
AMERICAN NATIONAL STANDARDS INSTITUTE
ACCREDITED STANDARDS COMMITTEE C63®

ANSI ASC C63® is pleased to report the publication of the 5th revision of ANSI C63.19, *American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.*

We recommend and request that the Commission recognize this new version of the standard, with an appropriate transition time between the previous, 2011 version, and this new version of the standard.

These comments review the history of this project and provide a summary of changes from the current published version, ANSI C63.19-2011.

I. Project Review

By 2015 technological changes, insights gained from using the 2011 version and other factors made the need for a revision to ANSI C63.19 apparent. The Project Initiation Notification System (PINS) form gave the following explanation of the need to revise the standard:

> *A number of developments, relevant to ANSI C63.19, created a need to review the impact and consider the advisability of revising and updating the standard. Among these developments are issues with:*
>
> 1) *Growing importance of VoIP and VoLTE for telephony services.*
> 2) *Hearing aid user satisfaction with HAC.*
> 3) *Adequacy of volume control.*
> 4) *Adequacy of T-Coil reception.*
> 5) *Harmonization with corresponding IEC 60118-13[1] and IEC 60601-2-66[2] standards.*
> 6) *Cover new technologies, particularly at TVWS devices and cellular at 600 MHz, 3.5 GHz and 5.0 GHz, which may include extending the lower boundary of the frequency range covered.*
> 7) *Use of software defined radio (SDR) and other new instrumentation in HAC measurements.*
> 8) *Simultaneous transmissions, particularly in smartphones.*

Based on the recommendation of subcommittee 8 (medical device EMC standards, the subcommittee that is responsible for ANSI C63.19, the ANSI ASC C63 committee approved the new project at its November 12, 2015 meeting.

The working group completed its work on the revision and on December 14, 2018 the draft of the revision was presented for ballot. While the standard met the criteria for approval after the first ballot, the response was not unanimous. In an effort to address all comments and concerns five recirculation ballots were conducted. The last of these closed successfully on June 10, 2019.

[1] IEC 60118-13, Electroacoustics—Hearing aids—Part 13: Electromagnetic compatibility (EMC).
[2] IEC 60601-2-66, Medical electrical equipment – Part 2-66: Particular requirements for the basic safety and essential performance of hearing instruments and hearing instrument systems.

The normal process is that once ANSI ASC C63® completes its ballot the revision is sent to ANSI for their approval. This was done with this revision of ANSI C63.19. The date of ANSI's final action, approving the standard was August 19, 2019. This action was announced in the ANSI Standards Action published on August 23, 2019.

II. Overview of Revision to ANSI C63.19

In this section we provided a summary of the changes from the version of the ANSI C63.19 standard currently recognized by the Commission, the 2011 version, and this new revision. We believe these changes are supportive of Commission long-standing goals for hearing aid compatibility.

A. Current Hearing Aid User Experience

The original motivation for ANSI C63.19 was RF interference from primarily GSM cell phones. With the change from 1st generation analog technology to 2nd generation digital technology and the introduction of GSM complaints of an audible 'buzz' were common. Many hearing aid wearers were unable to use a cellular phone because of the audible 'buzz' the RF interference created.[3]

Consumer groups and regulators have monitored the ability of hearing aid wearers to use telephones. Recent reports find the original problem, the 'buzz' created by RF interference, has largely been resolved. However, in surveys by HLAA (Hearing Loss Association of America) find that approximately 25% of hearing aid wearers continue to report problems using telephones.

ANSI ASC C63®, HIA (Hearing Industry Association) and HLAA have worked cooperatively to understand why such a high percentage of hearing aid wearers continue to report

[3] The changes in the T-Coil testing were made in response to the 2nd and 4th items in the PINS:
2) Hearing aid user satisfaction with HAC.
4) Adequacy of T-Coil reception.

problems using telephones. The conclusion of these efforts is that there are likely several reasons for these problems. However, one reason was discovered to be the fact that with changes introduced with smartphone technology it is possible for a phone to pass the ANSI C63.19 T-Coil requirements but fail to give a satisfactory user experience. The problem is that the standard requires T-Coil compliance at only a single measurement point. It was assumed, and it was generally true, in earlier phones, that if one point passed the tests then there would be consequentially an area where a hearing aid user could get adequate reception. However, with new technology it was discovered that the usable area could now be unacceptably small. It was possible to have a single point where good reception is possible in a sea of T-Coil noise. Addressing this finding became a very important purpose for the current project.

B. Elimination of Categories

In its original version ANSI C63.19 used a category system in which a phone and hearing aid were tested and placed in one of four categories. The user could then add the category numbers to identify combinations of hearing aids and phones which would work together. At the time there were no regulatory requirements that applied to mobile phones. It was also believed that it would be difficult or impossible for a wide variety of hearing aids and mobile phones to meet a single set of requirements.

As both industries have incorporated the standard into their development plans, there has been a convergence of performance for the issues addressed in this standard. Further, regulatory requirements establish thresholds for devices.

Finally, the category system, originally believed to be of help to hearing aid users, has been found to be more a source of confusion. The original intention has not been how things worked out. The categories have proven more confusing than helpful to hearing aid users.

For these reasons, the working group decided it was time to retire the category

system in favor of a simple set of requirements and thresholds that device meet to be classified as compliant with the requirements of this standard. The thresholds chosen were intended to be equivalent to the significant thresholds of the 2011 version, with adjustments for measurement differences in the standard. For wireless devices the threshold in the new revision is intended to be equivalent to the M3/T3 level in the 2011 version.

C. Harmonization with IEC 60118-13

An important consideration for the hearing aid requirements was harmonization with the corresponding IEC 60118-13[4] standard. While each of these standards serves a unique purpose, the working group found no reason for differentiation in areas they have in common. There is a significant benefit to industry to have a single test that qualifies a product for international markets. Achieving this goal was further aided by the fact that IEC 60118-13 was also undergoing revision. Harmonizing ANSI C63.19 and IEC 60118-13 was found to be both achievable, and to provide a significant benefit to the hearing instrument industry. Both working groups coordinated their revisions. The result is that these standards, in their new versions will be harmonized.[5]

D. Volume Control

Adding volume control requirements was an important addition to the standard. Harmonization of requirements regarding volume control was also found to provide significant benefit. In collaboration with TIA, it was decided that they would take the lead on this topic and that the working group for ANSI C63.19 would consider the volume control requirements they developed for landline phones. The ANSI C63.19 working group found no need to create a different requirement for mobile phones and so adopted as a requirement of ANSI C63.19 that a

[4] IEC 60118-13, Electroacoustics—Hearing aids—Part 13: Electromagnetic compatibility (EMC).

[5] This change was made in response to the 5th item in the PINS:

5) Harmonization with corresponding IEC 60118-13 and IEC 60601-2-66 standards.

Note that because IEC 60118-13 is referenced by IEC 60601-2-66, harmonization with IEC 60118-13 simultaneously resulted in harmonization with IEC 60601-2-66, without the need for explicitly addressing it.

wireless device also be compliant with ANSI/TIA-5050:2018, Telecommunications - Communications Products – Receive Volume Control Requirements for Wireless (Mobile) Devices.[6]

E. New technologies

An ongoing priority for ANSI C63.19 is to remain technologically current. It is critically important that the standard address new technologies, as they come into widespread use. The working group found that VoIP, VoLTE, TVWS devices and cellular at 600 MHz, 3.5 GHz and 5.0 GHz all needed consideration. Modifications were made to support the application of the standard to these emerging technologies.[7]

ANSI C63.19 was originally written to address all air interfaces. This goal was maintained through all its revisions, including the 5th revision. While all air interfaces are covered, specific guidance is provided on those that are most common. Tables D-5 through D-7 and Table 6-1 show the most common air interfaces, which were the ones that received special attention:

[6] The addition of a volume control requirement was made in response to the 3rd item in the PINS:

3) Adequacy of volume control.

[7] These changes address the 1st and 6th of the PINS:

1) Growing importance of VoIP and VoLTE for telephony services.
6) Cover new technologies, particularly at TVWS devices and cellular at 600 MHz, 3.5 GHz and 5.0 GHz, which may include extending the lower boundary of the frequency range covered.

Table D.5– Sample MIF values for some common 2G and 3G RF protocols

TRANSMISSION PROTOCOL	MODULATION INTERFERENCE FACTOR
GSM; full-rate version 2; speech codec/handset low	+3.5 dB
WCDMA; speech; speech codec low; AMR 12.2 kb/s	-20.0 dB
CDMA; speech; SO3; RC3; full frame rate: 8kEVRC	-19.0 dB
CDMA; speech; SO3; RC1;1/8th frame rate; 8kEVRC	+3.3 dB

Table D.6 – Sample MIF Values for LTE FDD

Mode	Modulation	# or RB	RB Offset	Avg. MIF (dB)
LTE FDD	QPSK	1	0	-14.4
	16QAM	1	0	-9. 7
		1	50%	-9.8
		1	100%	-9.7
		50%	0	-16.3
		100%	0	-17.4
	64QAM	1	0	-10.0
		1	50%	-9.7
		1	100%	-9.7
		50%	0	-16.0
		100%	0	-16.5

Table D.7 – Sample MIF Values for LTE TDD

Mode	UL-DL Config	Avg. MIF (dB)
LTE TDD	0	-3.2
	1	-1.6
	2	1.5
	3	-1.4
	4	0.7
	5	3.6
	6	-2.5

Table 6.1—Normal speech input levels

Standard	Protocol	Input (dBm0)
TIA/EIA/IS 2000	CDMA	–18
TIA/EIA-136	TDMA (50 Hz)	–18
J-STD-007	GSM (217 Hz)	–16
T1/T1P1/3GPP [32]	UMTS (WCDMA)	–16
iDEN®	TDMA (22 Hz and 11 Hz)	–18
VoIP[33, 34]	Voice over Internet Protocol	-16

[32] For UMTS (Universal Mobile Telecommunications System) refer to 3GPP TS26.131 and TS26.132 (http://www.3gpp.org).

[33] VoIP is used in this table as a general term specifying a group of voice services that use -16 dBm0 as their normal acoustic level. The group includes a variety of voice services, including Voice-over-LTE (VoLTE), Voice-over-IP-multimedia-subsystem (VoIMS), Voice-over-Wi-Fi (VoWiFi) and similar services. For 3G, LTE, and WLAN terminals used for Commercial Mobile Radio Service (CMRS) based telephony, refer to 3GPP TS26.131 and TS26.132.

[34] The manufacturer shall establish that -16 dBm0 is the normal acoustic level in order to place it in this category.

F. Reducing testing burden

A continuing goal is to keep the testing burden as low as possible and still meet the needs of the standard and, more importantly, of hearing aid wearers. In reviewing the testing required of wireless devices the working group determined that the near-field scan of a wireless device was largely redundant with testing the RF output power of the device. Testing the RF output power is already required for FCC compliance. The question the working group considered was whether that test essentially also predicted the RF near-field from a device. It determined that for many devices, it was possible to sufficiently predict the near-field intensity based on a device's RF transmit power to meet the needs of ANSI C63.19. Accordingly, this was made the preferred test, eliminating the requirement for near-field scanning of all devices. However, because some devices may still benefit from a near-field scan, that option was retained. Devices that have antennas placed away from areas a user might have their hearing aid are an example of the kind of device which may still desire to qualify based on a near-field scan.[8]

G. Low power exemption

A related topic to reduction of the testing burden is the low power exemption. The 2011 version provided a low power exemption. In the new version this exemption is continued but built into the process. While the new version does not specifically include a low power exemption, it continues to be included.

This inclusion can be seen in the procedures found in subclause 4.2, particularly step 1. With low power air interfaces, at this first step the peak conducted power is compared to the requirements in subclause 4.7, Tables 4.1 through 4.4.

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[8] The committee evaluated the potential for new kinds of instruments, particularly SDR based instruments, to be used in testing to this standard. This was in response to the 7th item in the PINS:

7) Use of software defined radio (SDR) and other new instrumentation in HAC measurements.

While the potential benefits of these instruments were recognized and use of the best available tools is encouraged, the committee concluded that specific changes in the standard were not required. It believed that the current material allows for new types of instruments to be adopted if they are adequate for the purpose of the intended measurement.

The typical test procedure would begin with the simplest test for each operating mode, proceeding to the more time-consuming tests only if qualification had not yet been achieved.

1) Measure peak conducted power; compare to the associated qualification level.
2) Measure RF audio interference power level (RFainl) (see 4.4); compare to the associated qualification level.
3) Measure peak E-field strength, averaged over the designated scan area (see 4.5.3.2.4); compare to the associated qualification level.
4) Measure RF audio interference level (RFail), averaged over the designated scan area (see 4.5.3); compare to the associated qualification level.

As can be seen, the first step in the evaluation is to measure the peak conducted power, which is required for all FCC grants and is a measurement that any product design team will routinely make. For low power air interfaces, when the peak conducted power is compared to the requirements in Table. 4.2 it will be found to be under the level given and so no further testing is required. So while there is not a stated low power exemption, the outcome is the same, low power air interfaces are exempt from RF testing under the standard.

Table 4.1 – Wireless device RF audio interference power level

Frequency Range	RF_{AIPL}
< 960 MHz	29 dBm
960 MHz to 2000 MHz	26 dBm
> 2000 MHz	25 dBm

Table 4.2 – Wireless device RF peak power level

Frequency Range	$RF_{Peak\ Power}$
< 960 MHz	35 dBm
960 MHz to 2000 MHz	32 dBm
> 2000 MHz	31 dBm

Table 4.3 – Wireless device RF Audio Interference Level

Frequency Range	RF_{AIL}
≤ 960 MHz	39 dB (V/m)
960 MHz to 2000	36 dB (V/m)
> 2000 MHz	35 dB (V/m)

Table 4.4 – Wireless device RF peak near-field level

Frequency Range	RF_{peak}
≤ 960 MHz	45 dB (V/m)
960 MHz to 2000	42 dB (V/m)
> 2000 MHz	41 dB (V/m)

H. Multiple simultaneous transmitters

Subclause 4.6, Multiple simultaneous transmitters, was added to address the increasing inclusion of multiple transmitters in smartphones.[9] The committee explore the possibility that multiple simultaneous transmitters might create new issues and require additional testing. However, no completing evidence that this was the case was found. The committee decided that testing air interfaces individually was adequate.

III. Request for recognition of the new revision of ANSI C63.19

We would take this opportunity to request that the FCC adopt the new revision of ANSI C63.19. We believe this revision will advance the FCC's objective for hearing aid compatibility and indeed a major motivation for this project was to meet the developing needs to support HAC in more frequency bands and with new technologies.

The new version was developed with active participation from the hearing aid user community, the hearing aid and mobile phone industries and other stakeholders. Every effort was made to produce a standard that represented a broad consensus of the stakeholders. It is the belief of the working group that this objective was achieved.

[9] This addressed the 8th item in the PINS:

8) Simultaneous transmissions, particularly in smartphones.

IV. Summary

ANSI ASC C63® reached the end of its work on the 5th revision of ANSI C63.19. This new version provides a significant advancement to prior versions. The change from a category system to simple set of limits and/or thresholds clarifies the requirements of the standard. The new test methods are better at measuring the potential for hearing aid interference.

We thank the Commission for this opportunity to provide them an update on this project and look forward, in the near future.

Respectfully submitted,

ANSI ASC C63®
Subcommittee 8 (Medical Devices)

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